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Evidenece for surface states in ZnO nanostructures using non-linear optical spectroscopy BENOY ANAND, Sri Satya Sai Institute of Higher Learning, MARTIN EGBLEWOGBE, University of Ghana, RAMAKRISHNA PODILA, Department of Physics, Clemson University, REJI PHILIP, Raman Research Institute, APPARAO RAO, Department of Physics, Clemson University — An unexpected presence of ferromagnetic (FM) ordering in nanostructured ZnO has been reported previously. Recently, from our detailed magnetization studies and *ab initio* calculations, we attributed this FM ordering in nanostructured ZnO to the presence of surface states, and a direct correlation between the magnetic properties and crystallinity of ZnO was observed. Such defect induced surface states appear as green/yellow emission in the photoluminescence spectrum of ZnO nanostructures. In this study, through a systematic sample preparation of both pristine and Co-doped ZnO nanostructures, and detailed PL and nonlinear optical measurements, we confirm that the observed FM ordering is due to the presence of surface states.

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